

Two New Species of *Dombeya* (Malvaceae) from Madagascar

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ABSTRACT. Two new Malagasy species of *Dombeya* Cavanilles subgen. *Xeropetalum* (Delile) K. Schumann (Malvaceae) are described. *Dombeya asymmetrica* Applequist is native to Mananara-Nord in northeastern Madagascar, and *D. rienanensis* Applequist to the Matatana River basin. *Dombeya rienanensis* is placed within subseries *Trohy* Arènes. *Dombeya asymmetrica* is tentatively placed within subseries *Repandae* Arènes; the species is distinguished by its long, narrow lanceolate leaves with asymmetrical apices.

RÉSUMÉ. Deux nouvelles espèces malgaches de *Dombeya* Cavanilles subgen. *Xeropetalum* (Delile) K. Schumann (Malvaceae) sont décrites. *Dombeya asymmetrica* Applequist est originaire de la région de Mananara-Nord au nord-est de Madagascar, et *D. rienanensis* Applequist du bassin du Matatana. *Dombeya rienanensis* est classée en subseries *Trohy* Arènes. *Dombeya asymmetrica* est classée provisoirement en subseries *Repandae* Arènes; l'espèce est caractérisée par ses feuilles longues, étroitement lancéolées, avec un apex asymétrique.

Key words: *Dombeya*, IUCN Red List, Madagascar, Malvaceae.

Dombeya Cavanilles is one of the larger genera of Malvaceae s.l. (formerly Sterculiaceae; cf. Bayer et al., 1999), with over 200 species recognized, and is an important component of the Malagasy flora. The last complete revision of *Dombeya* in Madagascar and the Comores recognized 187 species (Arènes, 1958, 1959) in two well-distinguished subgenera, whereas 19 species are recognized in Africa (Seyani, 1991), with one extending to Arabia, and 14 inhabit the Mascarenes (Friedmann, 1987). Since the publication of Arènes' (1959) treatment, further taxonomic efforts related to the Malagasy species of *Dombeya* have been limited (Barnett & Dorr, 1986; Dorr, 2001). Examination of herbarium specimens at P has led to the discovery of two specimens not referable to previously described species, both of which are herein described as new. Both species are native to humid forests of eastern or northeastern Madagascar; their provisional conservation status according to IUCN Red List criteria (IUCN, 2001) must be described as Data

Deficient (DD), since virtually nothing is known of their ranges or population size.

1. *Dombeya asymmetrica* Applequist, sp. nov.
TYPE: Madagascar. Prov. Toamasina: forêt d'Ibanda (NW Antanambe), Mananara-Nord, [16°23'S, 049°44'E?], 22 Feb. 1990 (fl.), *Raharimalala 190* (holotype, P). Figure 1.

Frutex usque ad 6 m altus; ramuli novelli confertim lepidoti. Folia petiolus 7–10 mm longus confertim lepidotus; lamina lanceolata basi cuneata vel rotundato-cuneata apice asymmetricice acuminata, 8–17.5 cm longa et 1.6–3.9 cm lata, infra sparsim lepidota supra sparsim lepidota vel glabra, venatione camptodroma tenui. Inflorescentia pauciflora pedunculo sparsim lepidoto usque ad 4.5 cm longo insidens; bracteae lanceolatae ca. 3 mm longae basaliter dilatatae confertim lepidotae; pedicelli 6–8 mm longi confertim lepidoti. Sepala 5, 5–6.5 mm longa basaliter connata lepidota plerumque non reflexa; petala 5 late obovata, 6.5–7 mm longa et ca. 5 mm lata, alba; stamina ca. 10 basaliter connata faciens coronam brevem, filamentis (1–)1.5–2(–2.5) mm longis, antheris anguste oblongis; staminodia linearia ca. 3 mm longa excedentia stamina fertilia; gynoecium 3-carpellare, ovario lepidoto, stylo 3–3.5 mm longo basaliter lepidoto ramis 1–1.3 mm longis.

Shrub 6 m high; small twigs densely lepidote with fringed scales. Leaves lanceolate, 8–17.5 × 1.6–3.9 cm; petiole 7–10 mm, densely lepidote; base cuneate or occasionally rounded; apex usually asymmetrically acuminate; venation pinnate, camptodromous, secondary veins numerous, narrow and inconspicuous especially on adaxial surface; both surfaces very sparsely lepidote, with scales mostly near midrib, sometimes becoming glabrous on adaxial surface. Inflorescences with very few flowers, on slender peduncles to 4.5 cm long; peduncle and rachis lepidote; floral bracts ca. 3 mm, lanceolate, widening at the base, densely lepidote; pedicels 6–8 mm, densely lepidote. Sepals 5, ca. 5–6.5 mm, fused basally, densely lepidote, the lobes not reflexed; petals 5, white, 6.5–7 mm, ca. 5 mm broad, broadly obovate, margins asymmetrically curved inward; stamens ca. 10, basally fused into a short corona; filaments (1–)1.5–2(–2.5) mm long, unequal; anthers narrowly oblong, 1–1.3 mm; staminodes linear, ca. 3 mm, longer than fertile stamens; gynoecium 3-

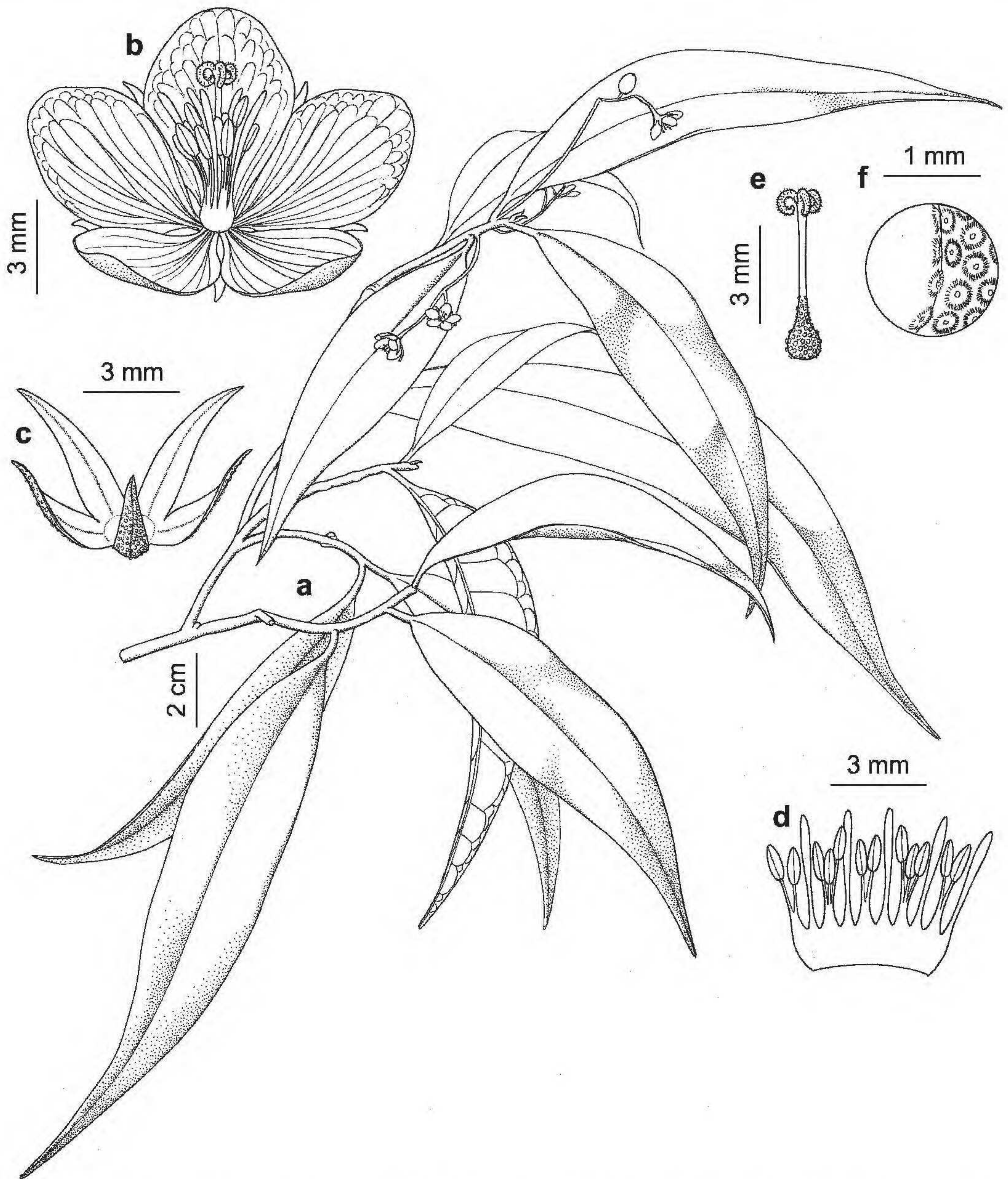


Figure 1. *Dombeya asymmetrica* Applequist. —A. Flowering branch. —B. Flower. —C. Calyx. —D. Androecium. —E. Gynoecium. —F. Lepidote scales of gynoecium. A–F drawn from the type, *Raharimalala 190* (P).

carpellate; ovary lepidote; stylar column 3–3.5 mm, basally lepidote, with 3 curled branches 1–1.3 mm long. Fruit unknown.

Habitat and distribution. The holotype is apparently from coastal forest or humid forest near the coast in northeastern Madagascar in the region of Mananara-Nord.

Phenology. Flowers have been collected in February.

Vernacular name. Rondrôo (rondro).

Discussion. The holotype specimen of *Dombeya asymmetrica* is remarkable for its long, narrowly lanceolate leaves with more or less asymmetrically acuminate apices; this leaf shape is virtually unknown in *Dombeya*, despite the exceptional range of variation within the genus. The species belongs to subgenus *Xeropetalum* (Delile) K. Schumann, which is characterized by gynoecia with fewer than five carpels. The

inflorescences of the only known specimen are very small and in poor condition. One appears to have been a reduced cyme with at least three buds, which, following Arènes' (1958, 1959) classification, would place it in section *Xeropetalum*. However, the possibility that other specimens might be keyed out to section *Decastemon* Planchon (umbellate, geminate or solitary flowers), perhaps even correctly so, cannot be discounted. Section *Decastemon*, a distinctive and probably monophyletic group, frequently has lanceolate leaves and slender, few-flowered inflorescences, as does this species. On the other hand, lepidote pedicels and sepals, such as are seen in *D. asymmetrica*, represent a very rare character in section *Decastemon*, which most often has glabrous and glandular, or occasionally stellate-pubescent, sepals. The species is tentatively placed in section *Xeropetalum* because of the apparently cymose inflorescence and lepidote indument, but the collection of more and better material would be highly desirable.

Once referred to section *Xeropetalum*, *Dombeya asymmetrica* is placed by Arènes' (1958, 1959) classification within subsection *Floribundae* Arènes (leaves bearing small scales not totally covering the surface), series *Epilosae* Arènes (ovary lepidote), subseries *Repandae* Arènes (sepals not reflexed), and would be identified by his key as *D. sahatavyensis* Arènes. As discussed below, Arènes' complex infrageneric classification, with many subgroups defined by single characters that vary repeatedly, probably includes many nonmonophyletic subgroups; thus, even if the inflorescences of *D. asymmetrica* are correctly interpreted, the predictive value of placement within subseries *Repandae* is unclear. *Dombeya asymmetrica* can be differentiated from all currently recognized species in subseries *Repandae* by its distinctive leaf shape and its small, slender inflorescences with only one order of branching; in fact, almost all species of section *Xeropetalum* normally have better developed inflorescences. Though the leaves of *D. sahatavyensis* are sometimes asymmetrical, they never have acuminate apices; *D. asymmetrica* also has shorter petioles and smaller flower parts, including petals, staminodes, and styles (though this must be interpreted with caution given the possibly poor condition of the holotype). Within subseries *Repandae*, *D. asymmetrica* should also be distinguished in particular from the widespread *D. laurifolia* (Bojer) Baillon, which has leaves that are highly variable but normally not lanceolate (being usually widest above the midpoint), asymmetrical, acuminate, or exceeding 13.5 cm long.

If a specimen of *Dombeya asymmetrica* were keyed out as belonging to section *Decastemon*, it would be

identified as belonging to subsection *Decantherae* Arènes (peduncles longer than pedicels), series *Lepidotae* Arènes (ovaries lepidote), which is presently a monotypic series including only *D. capuroniana* Arènes. That species has long narrow leaves, but the leaves are oblanceolate to oblong or elliptical, with acute, often shallowly toothed, more or less symmetrical apices. *Dombeya asymmetrica* is also distinguished by its flowers, which may be slightly smaller and are of different conformation (anthers oblong and at least 1 mm long vs. oval and less than 1 mm; style 3–3.5 mm long with short branches vs. about 1.5 mm long with branches to 4 mm long). The leaf shape and lepidote reproductive indument suffice to distinguish *D. asymmetrica* from all currently recognized species in section *Decastemon*.

2. *Dombeya rienanensis* Applequist, sp. nov.

TYPE: Madagascar. Prov. Fianarantsoa: haute vallée de la Rienana (bassin du Matitanana [= Matatana]), [22°14'S, 047°07'E], forêts, 1000–1400 m, 18–22 Nov. 1924 (fl.), *Humbert 3524* (holotype, P). Figure 2.

Haec species a *Dombeya gracilicyma* Arènes stipulis longioribus longiacuminatis, inflorescentiis minoribus saepe umbelliformibus, pedicellis brevioribus, corona staminali brevioribus, petalis minoribus, staminibus numerosioribus atque stylo brevioribus differt.

Tree; twigs grayish to tan, lepidote when young. Leaves obovate to oblanceolate, 4.5–9.2 × 2.1–4.3 cm; petiole 5–13 mm, densely lepidote; base cuneate to rounded-cuneate; apex ± rounded, occasionally slightly emarginate or cuspidate; margins entire to very slightly undulate; venation pinnate, camptodromous, secondary veins 5 to 8 (to 9) pairs, alternate in middle portion of leaf, sometimes pale; both surfaces lepidote with small scales, often sparsely so in larger leaves especially on the adaxial surface; stipules awl-shaped with a broadened base, 4–6 mm, lepidote, ± caducous. Inflorescences few-flowered cymes, often umbelliform, lateral, borne near twig apices; peduncles 1.4–2.6 cm; inflorescence bracts 2–4 mm, lanceolate, caducous; pedicels ± angular, articulated, 5–9 (–12) mm; floral bracts 3, borne slightly below base of flower, deltoid, 1.5–2 mm, caducous; inflorescences lepidote throughout. Sepals narrowly lanceolate, 4.8–7 mm, lepidote, mostly reflexed after anthesis, short-connate at immediate base and the adaxial surface of fused portion bearing small patches of pale, possibly glandular tissue; petals white, 6.2–8 × 3.2–4.5 mm, obovate to obdeltoid with asymmetrical apex; androecial corona 1.2–1.6 mm; fertile stamens oppositipetalous, 20 (to 25), in groups of 4 (to



Figure 2. *Dombeya rienanensis* Applequist. —A. Flowering branch. —B. Flower. —C. Petals of a single flower. —D. Portion of androecium. —E. Gynoecium. —F. Stipules. A–F drawn from the type, *Humbert 3524* (P).

6); filaments 0.8–1.4 mm; anthers oblong, 0.9–1 mm; staminodes narrowly spatulate, 3.6–4.5 mm, exceeding stamens; gynoecium 3- to 4-carpellate; ovary lepidote, inner surfaces of locules glabrous; style lepidote only at base, ca. 1.2–1.8 mm; style lobes recurved, 1.5–2.5 mm; ovules not winged. Fruit unknown.

Habitat and distribution. The type collection was from humid forest in southeastern Madagascar, in the

upper valley of the Rienana at a relatively high altitude (over 1000 m).

Phenology. Flowers have been collected in November.

Discussion. This species' sometimes 3-carpellate, not 5-carpellate gynoecium and characteristic small flowers place it in *Dombeya* subgen. *Xeropetalum*. The 4-carpellate condition seen in some flowers of the holotype is unusual but does occur, at least as an

abnormal condition, within other species of that subgenus. According to Arènes' (1958, 1959) classification, it would be placed within section *Xeropetalum*, subsection *Floribundae*, series *Epilosae*, subseries *Trohy* Arènes (sepals reflexed).

Many of Arènes' (1958, 1959) infrageneric groups are probably not monophyletic, as key characters occur repeatedly in his definitions of various infrageneric groups. For example, the presence or absence of reflexed sepals is the single character given to separate subseries *Trohy* from subseries *Repandae* within series *Epilosae* in *Dombeya*, and also the single character separating the monotypic subseries *Subsquamosae* Arènes from subseries *Dichotomae* Arènes within the hispid-ovary series *Pilosae* Arènes (also within subsection *Floribundae*). Likewise, within section *Xeropetalum* alone there are two pairs of sister series differentiated by having scaly versus stellate-pubescent ovaries. It is to be hoped that a molecular systematic study now in progress (Skema, pers. comm.) will identify major monophyletic lineages. Despite the serious limitations of the existing classification, *D. rienanensis* does generally resemble and seems to be reasonably placed with the three previously described species of subseries *Trohy*, which are likewise native to humid forests of eastern Madagascar.

Those three species (*Dombeya oblongipetala* Arènes, *D. gracilicyma* Arènes, and *D. trohy* Arènes) are not well known; they were described from only one specimen each, with few collections added since. However, *D. rienanensis* can be differentiated from all three. Firstly, *D. rienanensis* is distinguished from *D. oblongipetala* and *D. trohy* by its obovate to oblanceolate leaves with rounded apices; *D. oblongipetala* has obovate-oblong to oblong leaves with obtuse apices, while *D. trohy* has oblong to elliptical leaves, to 14 cm long with petioles to 3 cm long. *Dombeya rienanensis* also has significantly smaller flowers than either of these species (petals 6.2–8 mm long vs. ca. 12–13 mm long) and more stamens (borne in groups of four or more, giving a minimum number of 20 vs. 15 or sometimes 10 in *D. oblongipetala*). *Dombeya rienanensis* most closely resembles *D. gracilicyma*, as both may have obovate leaves of similar size, but has much smaller inflorescences, larger and differently shaped stipules if such are present, greater stamen number (20 or more vs. 15), and smaller floral parts (pedicels less than 12 mm vs. 15–20 mm long; style less than 2 mm vs. 3–4 mm long; and androecial corona coroniform rather than tubuliform). Its petals may also be smaller (less than 8 mm, vs. a reported petal length of 9–11 mm in *D. gracilicyma*), but this character is often rather variable within species of *Dombeya*.

Dombeya rienanensis can also be easily confused with the widespread, variable eastern species *D. laurifolia*, mentioned above. Arènes (1959) listed the type specimen of *D. rienanensis* among examined material of *D. laurifolia*, which was placed within subseries *Repandae*. The leaves of *D. laurifolia* are sometimes similar to those of *D. rienanensis*, but—in addition to the non-reflexed sepals—*D. laurifolia* has only five or five to 10 (to 15) stamens, a very short (0.5–1 mm) style, and short (3–4 mm) calyx lobes.

Notably, the type of *Dombeya rienanensis* has small patches of short, possibly glandular trichomes on the adaxial sepal surfaces at the extreme base, inside the very short fused portion of the calyx. A similar character is present in all species of the related genus *Helmiopsis* H. Perrier (Applequist, 2009), to which the type specimen has also once been referred. However, small glandular patches are also present in several species of *Dombeya* subg. *Dombeya* (pers. obs.) and may be present, although overlooked, in some other species of *Dombeya* not yet examined. *Helmiopsis*, whose members usually have a lepidote indument throughout, is differentiated from *Dombeya* by its usually winged seeds, often oppositisealous stamens, and sometimes glandular petals; the stipules of *Helmiopsis* are small and immediately caducous. All but one, apparently derived species of *Helmiopsis* are 5-carpellate. *Dombeya rienanensis*, which has unwinged ovules, oppositipetalous stamens, and relatively large, occasionally persistent stipules, is clearly properly placed within *Dombeya*, as traditionally circumscribed, rather than *Helmiopsis*.

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